

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) An electrochemical device component, comprising:
an active metal electrode having a first surface and a second surface; and
a protective membrane on the first surface of the electrode and having a smooth gap-free interface therewith, the membrane being ionically conductive and chemically compatible with the active metal on a side in contact with the active metal electrode, and substantially impervious, ionically conductive and chemically compatible with active metal corrosive environments on the other side;
wherein the ionic conductivity of the membrane is at least 10^{-5} S/cm; and
wherein the protective membrane comprises a composite, the composite comprising,
a first material in contact with the electrode, the first material being ionically conductive and chemically compatible with the active metal, wherein the first material comprises a composite reaction product of Li with Cu_3N , and
a second material in contact with the first material, the second material being substantially impervious, ionically conductive and chemically compatible with the first material and active metal corrosive environments, the second material selected from the group consisting of glassy or amorphous metal ion conductors, ceramic active metal ion conductors, and glass-ceramic active metal ion conductors,
wherein the ionic conductivity of the composite is at least 10^{-5} S/cm.
2. (canceled)
3. (currently amended) The component of claim 1 ~~claim 2~~, wherein the thickness of the second material in the composite is about 10 to 1000 microns.
4. (original) The component of claim 1, further comprising a current collector on the second surface of the active metal electrode.
- 5-6. (canceled)
7. (original) The component of claim 1, wherein the ionic conductivity of the membrane is at least 10^{-4} S/cm.

8. (original) The component of claim 1, wherein the active metal of the electrode is lithium or a lithium alloy.
- 9-10. (canceled)
11. (currently amended) The component of claim 1 ~~claim 2~~, wherein the second material comprises a glass-ceramic active metal ion conductor.
- 12-13. (canceled)
14. (currently amended) The component of claim 1 ~~claim 2~~, wherein the second material is an ion conductive glass-ceramic having the following composition:

Composition	mol %
P ₂ O ₅	26-55%
SiO ₂	0-15%
GeO ₂ + TiO ₂	25-50%
in which GeO ₂	0--50%
TiO ₂	0--50%
ZrO ₂	0-10%
M ₂ O ₃	0 < 10%
Al ₂ O ₃	0-15%
Ga ₂ O ₃	0-15%
Li ₂ O	3-25%

and containing a predominant crystalline phase composed of $\text{Li}_{1+x}(\text{M}, \text{Al}, \text{Ga})_x(\text{Ge}_{1-y}\text{Ti}_y)_{2-x}(\text{PO}_4)_3$ where $X \leq 0.8$ and $0 \leq Y \leq 1.0$, and where M is an element selected from the group consisting of Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm and Yb and/or and $\text{Li}_{1+x+y}\text{Q}_x\text{Ti}_{2-x}\text{Si}_y\text{P}_{3-y}\text{O}_{12}$ where $0 < X \leq 0.4$ and $0 < Y \leq 0.6$, and where Q is Al or Ga.

15. (currently amended) The component of claim 1 ~~claim 2~~, wherein the second material is a flexible membrane comprising particles of an ion conductive glass-ceramic having the following composition:

Composition	mol %
P ₂ O ₅	26-55%
SiO ₂	0-15%
GeO ₂ + TiO ₂	25-50%
in which GeO ₂	0--50%
TiO ₂	0--50%
ZrO ₂	0-10%
M ₂ O ₃	0 < 10%
Al ₂ O ₃	0-15%
Ga ₂ O ₃	0-15%
Li ₂ O	3-25%

and containing a predominant crystalline phase composed of $\text{Li}_{1+x}(\text{M}, \text{Al}, \text{Ga})_x(\text{Ge}_{1-y}\text{Ti}_y)_{2-x}(\text{PO}_4)_3$ where $X \leq 0.8$ and $0 \leq Y \leq 1.0$, and where M is an element selected from the group consisting of Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm and Yb and/or and $\text{Li}_{1+x+y}\text{Q}_x\text{Ti}_{2-x}\text{Si}_y\text{P}_{3-y}\text{O}_{12}$ where $0 < X \leq 0.4$ and $0 < Y \leq 0.6$, and where Q is Al or Ga in a solid polymer electrolyte.

16. (currently amended) The component of claim 1 ~~claim 2~~, wherein the protective composite is a laminate of discrete layers of the first material and the second material.

17. (currently amended) The component of claim 1 ~~claim 2~~, wherein the protective composite comprises a gradual transition between the first material and the second material .

18-51. (canceled)

52. (new) An electrochemical device component, comprising:

an active metal electrode having a first surface and a second surface; and

a protective membrane on the first surface of the electrode and having a smooth gap-free interface therewith, the membrane being ionically conductive and chemically compatible with the active metal on a side in contact with the active metal electrode, and substantially impervious, ionically conductive and chemically compatible with active metal corrosive environments on the other side;

wherein the ionic conductivity of the membrane is at least 10^{-5} S/cm; and

wherein the protective membrane comprises a composite, the composite comprising,

a first material in contact with the electrode, the first material being ionically conductive and chemically compatible with the active metal, wherein the first material comprises a composite reaction product of the active metal with copper nitride (Cu_3N), and

a second material in contact with the first material, the second material being substantially impervious, ionically conductive and chemically compatible with the first material and active metal corrosive environments, the second material selected from the group consisting of glassy or amorphous metal ion conductors, ceramic active metal ion conductors, and glass-ceramic active metal ion conductors,

wherein the ionic conductivity of the composite is at least 10^{-5} S/cm.

53. (new) The component of claim 52, wherein the thickness of the second material in the composite is about 10 to 1000 microns.

54. (new) The component of claim 52, further comprising a current collector on the second surface of the active metal electrode.

55. (new) The component of claim 52, wherein the ionic conductivity of the membrane is at least 10^{-4} S/cm.

56. (new) The component of claim 52, wherein the active metal of the electrode is lithium or a lithium alloy, and the first material comprises a composite reaction product of Li with Cu_3N .

57. (new) The component of claim 52, wherein the second material comprises a glass-ceramic active metal ion conductor.

58. (new) The component of claim 52, wherein the second material is an ion conductive glass-ceramic having the following composition:

Composition	mol %
P_2O_5	26-55%
SiO_2	0-15%
$\text{GeO}_2 + \text{TiO}_2$	25-50%

in which	GeO ₂	0--50%
	TiO ₂	0--50%
	ZrO ₂	0-10%
	M ₂ O ₃	0 < 10%
	Al ₂ O ₃	0-15%
	Ga ₂ O ₃	0-15%
	Li ₂ O	3-25%

and containing a predominant crystalline phase composed of $\text{Li}_{1+x}(\text{M}, \text{Al}, \text{Ga})_x(\text{Ge}_{1-y}\text{Ti}_y)_{2-x}(\text{PO}_4)_3$ where $X \leq 0.8$ and $0 \leq Y \leq 1.0$, and where M is an element selected from the group consisting of Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm and Yb and/or and $\text{Li}_{1+x+y}\text{Q}_x\text{Ti}_{2-x}\text{Si}_y\text{P}_{3-y}\text{O}_{12}$ where $0 < X \leq 0.4$ and $0 < Y \leq 0.6$, and where Q is Al or Ga.

59. (new) The component of claim 52, wherein the second material is a flexible membrane comprising particles of an ion conductive glass-ceramic having the following composition:

Composition	mol %
P ₂ O ₅	26-55%
SiO ₂	0-15%
GeO ₂ + TiO ₂	25-50%
in which	
GeO ₂	0--50%
TiO ₂	0--50%
ZrO ₂	0-10%
M ₂ O ₃	0 < 10%
Al ₂ O ₃	0-15%
Ga ₂ O ₃	0-15%
Li ₂ O	3-25%

and containing a predominant crystalline phase composed of $\text{Li}_{1+x}(\text{M}, \text{Al}, \text{Ga})_x(\text{Ge}_{1-y}\text{Ti}_y)_{2-x}(\text{PO}_4)_3$ where $X \leq 0.8$ and $0 \leq Y \leq 1.0$, and where M is an element selected from the group consisting of Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm and Yb and/or and $\text{Li}_{1+x+y}\text{Q}_x\text{Ti}_{2-x}\text{Si}_y\text{P}_{3-y}\text{O}_{12}$ where $0 < X \leq 0.4$ and $0 < Y \leq 0.6$, and where Q is Al or Ga in a solid polymer electrolyte.

60. (new) The component of claim 52, wherein the protective composite is a laminate of discrete layers of the first material and the second material.

61. (new) The component of claim 52, wherein the protective composite comprises a gradual transition between the first material and the second material .